

# Seminar in Disease Ecology

## University of Colorado - Boulder, Department of Geography

Monday  
9:00-11:50am

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**Office Hours:** Monday & Wednesday 1-2:30pm or by appointment

### Course Description

This seminar is designed to introduce you to: 1) the subdiscipline of medical/health geography and, 2) the theories and methods of one major tradition within the subdiscipline - disease ecology. We will use the disease ecology framework to explore the ways in which human behavior, as influenced by cultural and social norms and economic circumstances, interacts with both the physical and biological environment to produce or prevent disease. From emerging tropical diseases to HIV/AIDS to heart disease and obesity, we will learn to critically assess where diseases occur, when and why. Throughout the semester we will examine, learn and debate the concepts of health and disease, emergence and reemergence, individual health and public health, from a geographical perspective. We will cover many specific diseases, but in addition to their inherent interest, each is exemplary of particular aspect of disease ecology.

If you were to choose to focus on health or medical issues (i.e. medical geography, medical anthropology, epidemiology, public health) you would probably take entire courses that deal with the information that occurs in only one section of this course. Some of these areas are going to more or less interesting to you. If you like the biological sciences, you will be interested in the sections dealing with ecological change and viral evolution. If your interests lie more in culture and behavior, the sections on migration, poverty and political economy will be more to your liking. Similar to the discipline of geography as a whole, medical geography deals with human-environment interactions but focuses on the influence these interactions have on health. What distinguishes medical geography from the discipline of geography as a whole is simply its thematic focus, not its methods or theoretical grounding.

### What I think about teaching

My philosophy of teaching is that students need to learn to learn. This may sound strange, after all haven't we been in school a really long time? Don't we already know how to learn? The answer to this question is yes, we do know how to learn in some ways but college should require greater depth and breadth of thinking, especially by your 3<sup>rd</sup> or 4<sup>th</sup> year. What I found out during the course of my PhD is that I needed to **teach myself** a great deal because there were often no classes on the methods or subjects in which I became interested. Sometimes, there wasn't even a professor on campus who knew anything about my topic! So, I think it's very important for you to learn how to find the information you need through research and how to apply it to real world problems. Learning will therefore come about through research, reading, listening, communication and collaboration with other students. Yes, this means group work. The other thing I found out after working in both the private sector and at a University is that very little research is done by one person. Most of the best science is conducted by **teams of researchers** who brainstorm and discuss and learn together.

This is a critical thinking seminar! This course will be conducted using a modified **problem based learning (PBL)**. The PBL approach allows for student collaboration in an active learning environment. PBL requires students to activate prior knowledge and elaborate on that knowledge in small group discussions. This knowledge and knowledge gained through focused reading is then integrated around relevant problems and information. Students will be assigned to a group which will be their group for the entire semester. In this group, students will be given problems to solve. While the class will involve some “mini lectures” on specific topics as well as whole group discussion. A certain portion of our classes will be designated to the PBL groups.

When the PBL method is used and a problem is distributed, discussion groups will work on the problem in class (steps 1-3 and 5) and outside of class (4 & 6):

1. Students are presented with a problem (case study, research paper, for example). Students first clarify unknown terms and concepts in the problem description (since we'll be reading papers from epidemiology journals, there will likely be many terms you haven't heard before). Groups then organize their ideas and previous knowledge related to the problem, and attempt to define the broad nature of the problem.
2. Throughout discussion, students pose questions, called “learning issues,” on aspects of the problem that they do not understand. These learning issues are recorded by the group. Students are continually encouraged to define what they know - and more importantly - what they don't know.
3. Students rank, in order of importance, the learning issues generated in the session. They decide which questions will be followed up by the whole group, and which issues can be assigned to individuals, who later teach the rest of the group. Students and instructor also discuss what resources will be needed in order to research the learning issues, and where they could be found.
4. Students research their assigned learning issue(s) through self directed study outside of class and summarize this knowledge by writing clear and concise reflection paper, which will be brought to class. If new “learning issues” arise during the course of research, be sure to record these and bring them back to the group.
5. When students reconvene, they explore the previous learning issues, integrating their new knowledge into the context of the problem. Each group member “teaches” other group members what they've learned through self-directed research and shares resources. Often, new learning issues are defined as the group progresses through the problem.
6. Groups write a short (2-3 page single-spaced) report which presents their “answer” to the problem.

### **Groups**

Problem discussion groups will be determined randomly and will consist of approximately 5-6 members. For each problem, a group “**leader**” will be appointed by the group. The leader will make sure that everyone has a chance to talk and keeps the group ‘on task’. A “**scribe**” will also be designated by the group. The scribe's job is to write down everything that everyone in the group says. You may wish to bring your laptop to class! Every group member will play both of these roles many times throughout the semester. My job as “tutor” will be to clarify issues and to keep the groups on task. If lecture is needed to clarify some theories or concepts, it will be given.

The second day of class, I will have you work in your groups to set out “ground rules”. You will submit a copy to me and keep a copy for your team. I understand that sometimes group dynamics don’t work. If you experience irreconcilable problems in your group, and an individual is violating the group’s ground rules, there will be an option to “divorce” a group member, but only after a strict protocol is adhered to:

1. The group will choose one member to talk directly to the problem individual. During this discussion, every attempt will be made to resolve the conflict. Be sure to refer to the “ground rules” your group made and let the individual know which of those rules he or she has violated. Be nice! This is your team member, so don’t gang up on him or her.
2. If the individual does “clean up” his or her act, the group will prepare an email to me, cc’ing all group members, outlining the problem, which ground rules have been violated, and providing evidence that you have already tried to resolve the problem using the method in step 1 (above). I will review the email and ask the group to come meet with me during office hours.
3. If the individual still does not change his or her behavior, I will talk with that student one-on-one and attempt to resolve the issue. If it cannot be resolved the individual may be “divorced” from the group. This will have **serious consequences** for the group portion of that individual’s grade.

### **Assessment**

You will be assessed on both your individual work in the class and on group work. The importance of each component will be as follows:

|                                |     |
|--------------------------------|-----|
| Group papers                   | 40% |
| Individual “reflection papers” | 40% |
| Midterm                        | 10% |
| Final                          | 10% |

### Group papers

Most problems or case studies will result in a short (2-3 page single-spaced) report. You will also be required to submit the notes you took during your group discussion.

Group members will evaluate the relative contributions of each group member to each project. These evaluations will be anonymous and will require a grade and an explanation of the grade. Thus, you will grade yourself and each other member of the group for each problem. (For example, if the group earns a 90 on the paper and member A earns all A’s from her group peers, she will receive a 90. However, if member B receives Ds from his group peers, he will receive a D for the paper).

### Individual “reflection papers”

For each problem or case-study we work through, I will also pose a set of individual questions that you may choose to answer in a short (1-2 page, single-spaced) reflection paper. This must be completed at least 5 times during the semester. The questions may ask you to elaborate on what you’ve learned during the problem or may ask about your self-directed learning style, group dynamics and/or personal contributions to the group.

### Exams

We will have two exams during the semester: a midterm and a final. They will consist of an in-class group component and a take-home individual component.

### Attendance

Due to the PBL structure of the class, students are expected to attend all classes. **One absence will be allowed.** After that, any student missing class (without an extremely good excuse) will receive a D on the group assignment.

### **Readings**

There will be some required readings in this course, most of which will directly prepare you for the case-study or problem that we will work through in class. I will also suggest some additional reading that may not seem directly relevant to the problem, but rather present a different disease with a similar ecology or provide a more in depth look at the disease we study in class. This suggested reading will help you understand how to apply the disease ecology framework within the broader context of public health. Below, I list the required and suggested textbooks. All are available in the bookstore, but are probably cheaper on Amazon.com.

### Required

Robert S. Desowitz, *New Guinea Tapeworms and Jewish Grandmothers: Tales of Parasites and Peoples*. New York: W. W. Norton, 1987.

Barry Popkin, *The World Is Fat--The Fads, Trends, Policies, and Products That Are Fattening the Human Race*. New York: Avery-Penguin Press, 2008.

Sandra Steingraber, *Living Downstream: A Scientists Personal Investigation of Cancer and the Environment*. New York: Vintage Books, 1998.

### Optional

Madeleine Drexler, *Secret Agents: The Menace of Emerging Infections*. New York: Penguin Books, 2003.

Susan Hunter, *Black Death: AIDS in Africa*. New York: Palgrave Macmillan, 2003.

Michael Marmot, *The Status Syndrome: How Social Standing Affects Our Health and Longevity*. New York: Holt, 2004.

### **University Policies**

#### Disabilities

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services within the **first two weeks** of the semester. Disability Services determines accommodations based on documented disabilities. Contact: <http://www.colorado.edu/disabilityservices>.

#### Class Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Further information is available at: <http://www.colorado.edu/policies/classbehavior.html>.

#### Discriminatory and Sexual Harassment

The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about

the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>.

#### Academic Integrity

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. See the following site:

<http://www.colorado.edu/academics/honorcode/>. "Our university community aspires to the highest standards of integrity and does not accept dishonesty or respect. We are committed to the fundamentalist values of honesty trust fairness, respect, and responsibility. These values enable us to promote teaching and learning, academic excellence, the pursuit of truth, free and open inquiry and discourse, responsible citizenship, and compassion. Each person at the University of Colorado at Boulder is responsible for upholding the honor code and helping to create an environment in which the integrity of the campus community is defined by mutual respect, self respect, and shared responsibility."

#### Religious Observances/Absences

Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please come to me in advance if this is an issue, so we can work out alternative arrangements. See full details at: [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html).

Disease Ecology Seminar: Reading and Assignment Schedule

| Date                                      | Topic   | Readings  | Assignments                    |
|---|---|---|--------------------------------|
| <b>INTRODUCTION/EPIDEMIOLOGY CONCEPTS</b> |   |   |                                |
| Aug 24 <sup>th</sup>                      | Introduction to Medical Geography<br>The Disease Ecology Framework<br>What is PBL?<br><br>PBL: Working in groups with PBL                                     | Meade, M. 1977. Medical geography as human ecology, <i>Geog Review</i> , 67:379-393.<br>Mayer, JD. 1982. Relations Between Two Traditions of Medical Geography, <i>Prog Human Geog</i> , 6:216-230.<br>Rosenberg, M.W. 1998. Medical Geography or Health Geography? Populations, peoples and places. <i>Int J Pop Geog</i> , 4:211-226.   |                                |
| Aug 31 <sup>st</sup>                      | Drivers of Emerging and Re-emerging Diseases<br>The study of epidemiology<br><br>Case Study: Outbreak Investigation!  | Mayer, J. 2000. Geography, ecology, and emerging infectious diseases. <i>Soc Sci &amp; Med</i> 50: 937-952.<br>Emch, M.E. and Root, E.D. 2008. Emerging and Reemerging Infectious Diseases. <i>Companion to Health and Medical Geography</i> .<br>Confalonieri, U., et al., 2007. Human health. <i>Climate Change 2007: Impacts, Adaptation and Vulnerability</i> . M.L. Parry, et al. (eds). Cambridge, UK: Cambridge University Press, 393-419.<br>Optional: Drexler: |                                |
| Sept 7 <sup>th</sup>                      | NO CLASS – LABOR DAY  |   |                                |
| <b>INVESTIGATING DISEASE ECOLOGIES</b>    |   |   |                                |
| Sept 14 <sup>th</sup>                     | Ecological Change <ul style="list-style-type: none"> <li>• Ecological change mini lecture</li> </ul> PBL: Controlling the Nile: The Aswan Dam Debate (Part 1) | Desowitz: Chapters 1, 2, 4 and 7  | Outbreak Investigation PBL Due |
| Sept 21 <sup>st</sup>                     | Ecological Change<br><br>PBL: Controlling the Nile: The Aswan Dam Debate (Part 2)   |   |                                |

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|                       |  |   |                            |
|-----------------------|--|---|----------------------------|
| Sept 28 <sup>th</sup> | NO CLASS - IUSSP International Population Conference (Marrakech, Morocco)  |   |                            |
| Oct 5 <sup>th</sup>   | <p>Evolution of Pathogens &amp; People</p> <ul style="list-style-type: none"> <li>• Evolution mini lecture</li> </ul> <p>PBL: The Origin of HIV/AIDS: Where did it come from? (Part 1)</p>   | <p><i>Required:</i><br/>Ewald, P., 1994. AIDS: Where did it come from and where is it going? <i>Evolution of Infectious Disease</i>. Oxford: Oxford University Press, 119-143.</p> <p>Drexler: Chapters 1 and 8</p> <p><i>Optional:</i> Hunter: Chapters 4, 5 and 7</p> | Ecological Change PBL Due  |
| Oct 12 <sup>th</sup>  | <p>Evolution of Pathogens &amp; People</p> <ul style="list-style-type: none"> <li>• Drug resistance mini lecture</li> </ul> <p>PBL: The Origin of HIV/AIDS: Mutation, Drug Resistance and Poverty (Part 2)</p>   | <p>Ewald, P., 1994. The Fight Against AIDS: Biomedical Strategies and HIV's Evolutionary Responses. <i>Evolution of Infectious Disease</i>. Oxford: Oxford University Press, 159-180.</p>   |                            |
| Oct 19 <sup>th</sup>  | MIDTERM  |   |                            |
| Oct 26 <sup>th</sup>  | <p>Migration and Globalization</p> <ul style="list-style-type: none"> <li>• Demographic and mobility transitions mini lecture</li> </ul> <p>PBL: The Problem of Old Tires: The Globalization of Dengue</p>   | TBA   | Evolution PBL Due          |
| Nov 2 <sup>nd</sup>   | <p>Political Conflict</p> <ul style="list-style-type: none"> <li>• Colonialism, human rights and political ideology mini lecture</li> </ul> <p>PBL: Colonialism, copper and civil war: the rise and fall and rise of Human African Trypanosomiasis</p> | <p>Desowitz: Chapter 8</p> <p>Selected articles on Trypanosomiasis TBA</p>  |                            |
| Nov 9 <sup>th</sup>   | <p>Nutrition &amp; Lifestyle Change</p> <ul style="list-style-type: none"> <li>• Epidemiological transition and political economy mini lecture</li> </ul> <p>PBL: Obesity</p>  | <p>Popkin: pp. 17-143</p>   | Migration Conflict PBL Due |

Disease Ecology Seminar: Reading and Assignment Schedule

|                      |  |   |   |
|----------------------|--|---|---|
| Nov 16 <sup>th</sup> | <p>Nutrition &amp; Lifestyle Change</p> <ul style="list-style-type: none"> <li>Nutrition transition mini lecture</li> </ul> <p>PBL: Obesity</p>                                    |   | Political Conflict<br>PBL Due               |
| Nov 23 <sup>rd</sup> | NO CLASS – FALL BREAK  |   |   |
| Nov 30 <sup>th</sup> | <p>Environmental Exposure</p> <ul style="list-style-type: none"> <li>Exposure pathways mini lecture</li> </ul> <p>Case Study: Childhood Cancer</p>                                 | Steingraber: Prologue, Chapters 1- 4, 7-12.   | Nutrition PBL<br>Due                        |
| Dec 7 <sup>th</sup>  | <p>Poverty and Health</p> <ul style="list-style-type: none"> <li>Racism, historical legacy and unequal distribution of resources</li> </ul> <p>PBL: HIV and TB in South Africa</p> | <p>Garrett, L. 1994. Thirdworldization. The Coming Plague. New York: Penguin Books, 457-527.</p> <p><i>Optional:</i> Marmot: Chapters 1-5</p> | Environmental<br>Exposure Case<br>Study Due |
|                      | FINAL EXAM   |   | Poverty PBL Due                             |